Entering Algebra 2 AAC Review Packet - SHOW ALL WORK! No calculators. Name Key

Part 1: Solving Equations **Solve for the variable in each equation using any method. Show all work.**

1. $3x + 6 = -24$ $x=-10$	2. $\frac{3}{4}(d - 3) = -9$ $d=-9$
3. $12 = \frac{8r+5-3r}{4}$ $r=\frac{43}{5}$	4. $\frac{1}{2}(10 - 2a) = 12$ $a=-7$
5. $21 = 7(y - 7)$ $y=10$	6. $0 = x^2 + 2x$ $0=x(x+2)$ $\{0,-2\}$
7. $9x^2 = 25$ $\sqrt{x^2}=\sqrt{\frac{25}{9}}$ $\{\pm\frac{5}{3}\}$	8. $x^2 - 13x + 12 = 0$ $(x-12)(x-1)=0$ $\{1,12\}$
9. $3x^2 - 6x - 2 = 4 + 5x - 7x^2$ $10x^2-11x-6=0$ $(5x+2)(2x-3)=0$ $\{\frac{3}{2},-\frac{2}{5}\}$	10. $x^2 = 5x + 24$ $x^2-5x-24=0$ $(x-8)(x+3)=0$ $\{-3,8\}$

Part 2: Simplifying and Evaluating Expressions **Show all work.**

1. Evaluate $f(a,b,c) = ab^2 + \frac{1}{2}a - 3ac$ for a = 10, b = -6, c = -4. 485	2. Evaluate $f(x, y, z) = 2.5x^3 + x^{-2}y - xz$ for x = 2, y = 8, and z = -3. 28
3. Simplify: $5x^3y^4 + 7x^2y^4 - 2x^3y^4$ $3x^3y^4+7x^2y^4$	4. Simplify: $(4y - 6)^2$ $16y^2-48y+36$
5. Simplify: $(5x^2 - 4y^3)(3x^3 + 7y)$ $15x^5+35x^2y-12x^3y^3-28y^4$	6. Simplify: $8\sqrt{3} + 3\sqrt{27} - \sqrt{300}$ $8\sqrt{3}+9\sqrt{3}-10\sqrt{3}$ $7\sqrt{3}$
7. Simplify: $10\sqrt{6}\cdot 2\sqrt{3}\cdot\sqrt{3}$ $10\cdot 2\ \sqrt{6}\cdot\sqrt{9}$ $10\cdot 2\cdot 3\cdot\sqrt{6}$ $60\sqrt{6}$	8. Simplify: $2\sqrt{2}\cdot 3\sqrt{3}\cdot 5\sqrt{2}\cdot\sqrt{4} + 2\sqrt{3}$ $30\cdot 2\cdot 2\sqrt{3}+2\sqrt{3}$ $120\sqrt{3}+2\sqrt{3}$ $122\sqrt{3}$
9. Simplify: $(3x^2 - 4y)^2$ $9x^4-24x^2y+16y^2$	10. Simplify: $(2x - 3y)^3$ $8x^3-36x^2y+54xy^2-27y^3$

Part 3: Exponents and Radicals **Simplify the following radical expressions. No decimals. Show work.**

1. $\sqrt{44}$ $\sqrt{4}\cdot\sqrt{11}$ $2\sqrt{11}$	2. $5\sqrt{24}$ $5\cdot\sqrt{4}\cdot\sqrt{6}$ $10\sqrt{6}$
3. $6\sqrt{49}$ $6\cdot 7$ 42	4. $2\sqrt{28}+\sqrt{63}$ $4\sqrt{7}+3\sqrt{7}$ $7\sqrt{7}$
5. $6\sqrt{8}-\sqrt{98}$ $5\sqrt{2}$	6. $2\sqrt{10}\cdot 3\sqrt{6}$ $12\sqrt{15}$
7. $\dfrac{6\sqrt{48}-2\sqrt{27}}{\sqrt{12}}$ $\dfrac{24\sqrt{3}-6\sqrt{3}}{\sqrt{12}}=\dfrac{18\sqrt{3}}{2\sqrt{3}}$ 9	8. $\left(2\sqrt{2}\right)^2$ $4(2)$ 8
9. $\left(5\sqrt{7}\right)^2$ $25\cdot 7$ 175	10. $\left(\sqrt{20}\right)^3$ $(2\sqrt{5})^3$ $8\cdot 5\cdot\sqrt{5}$ $40\sqrt{5}$

Part 4: Working with Like and Unlike Terms **Simplify fully. Write in decreasing exponential form.**

1. $(6x^2+1)+(5x^2-4)$ $11x^2-3$	2. $(2x^3+11x+2)-(x^3-2x+7)$ $x^3+13x-5$
3. $(x^2-3x+3)-(x^2+x-1)$ $-4x+4$	4. $(14-16x)+(10x-5)$ $-6x+9$
5. $(8x^3-1)-(20x^3+2x^2-x-5)$ $-12x^3-2x^2+x+4$	6. $6x-(22x+3-36x^2+x^3)$ $-x^3+36x^2-16x-3$
7. $(4x^2-15x+16)+(2x-20)$ $4x^2-13x-4$	8. $(7x^3-2+x^2+13x)-(4x^3+10)$ $3x^3+x^2+13x-12$

Part 5: Factoring/Solving Factor each expression or equation, if possible. Solve if appropriate. Show work.

1. $3x^3+12x^2$

$3x^2(x+4)$

2. $x^2+7x=-12$

$x^2+7x+12=0$

$(x+3)(x+4)=0$

$\{-3,-4\}$

3. $x^2-x-6=0$

$\{3,-2\}$

4. x^2-25

$(x+5)(x-5)$

5. x^2+9

PRIME: cannot factor x^2+9

6. $2x^2-5x=3$

$2x^2-5x-3=0$

$(2x+1)(x-3)=0$

$\{-\frac{1}{2},3\}$

7. $3x^2-19xy+20y^2$

$(3x-4y)(x-5y)$

8. $25x^2-9y^2$

$(5x+3y)(5x-3y)$

9. $10x^2+17xy+3y^2$

$(2x+3y)(5x+y)$

10. $-4x=10x^2-24x^3$

$10x^2-24x^3+4x=0$

$-2x(12x^2-5x-2)=0$

$-2x(3x-2)(4x+1)=0$

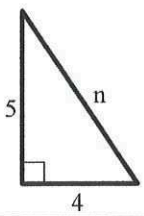
$\{0,-\frac{1}{4},\frac{2}{3}\}$

Part 6: Using Pythagorean Theorem Express n as a radical in simplest form. Show your work.

1. $\sqrt{41}$

$4^2+5^2=n^2$

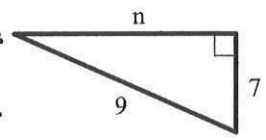
$41=n^2$



2. $4\sqrt{2}$

$n^2+7^2=9^2$

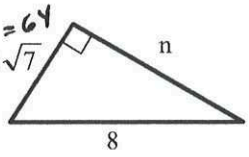
$n^2=32$



3. 6

$n^2+(2\sqrt{7})^2=8^2$

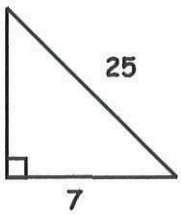
$n^2=36$



4. 24

$n^2+49=625$

$n^2=576$

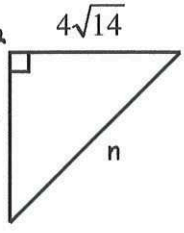


5. $2\sqrt{158}$

$(2\sqrt{2})^2+(4\sqrt{14})^2=n^2$

$n^2=232$

$n=\sqrt{232}$

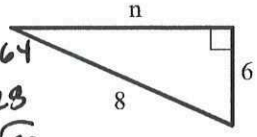


6. $2\sqrt{7}$

$n^2+36=64$

$n^2=28$

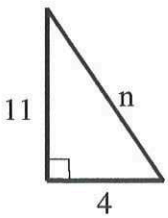
$n=\sqrt{28}$



7. $\sqrt{137}$

$16+121=n^2$

$137=n^2$

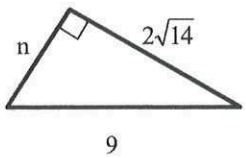


8. 5

$n^2+(2\sqrt{14})^2=9^2$

$n^2+4(14)=81$

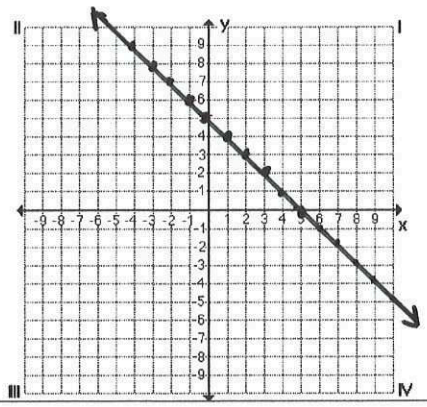
$n^2=25$



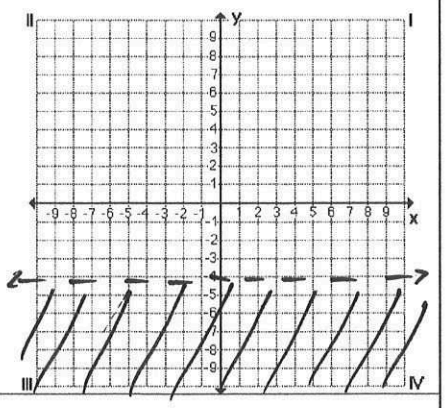
Part 7: Graphing Graph each of the following equations or inequalities. Use a ruler.

1. $x + y = 5$

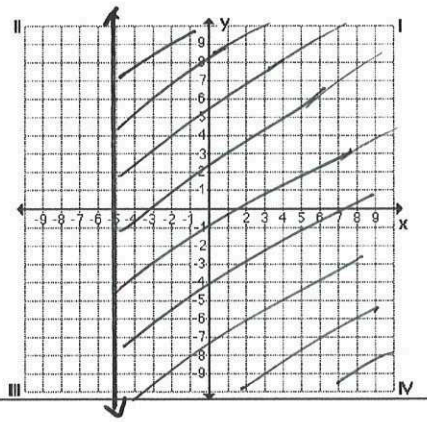
$y = -x + 5$



2. $y < -4$



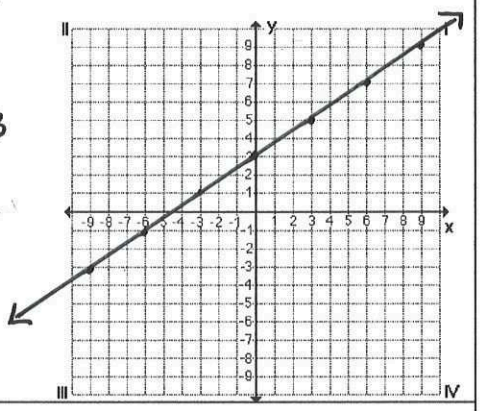
3. $x \geq -5$



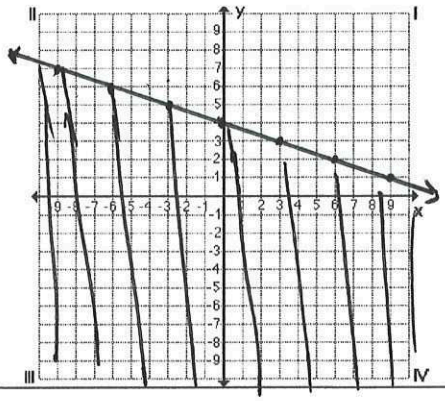
4. $2x + 9 = 3y$

$3y = 2x + 9$

$y = \frac{2}{3}x + 3$

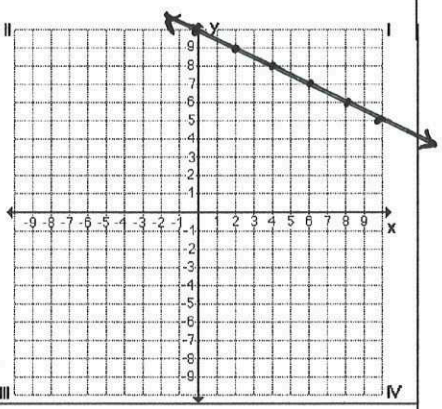


5. $y \leq -\frac{1}{3}x + 4$

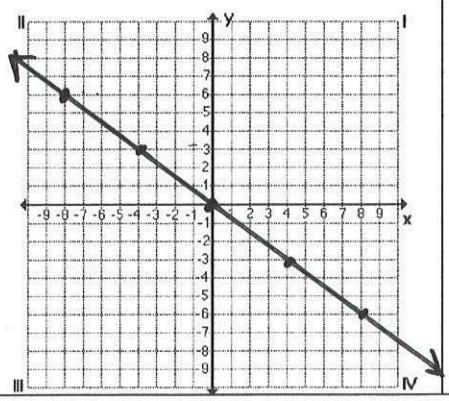


6. $\frac{1}{2}x = -y + 10$

$y = -\frac{1}{2}x + 10$



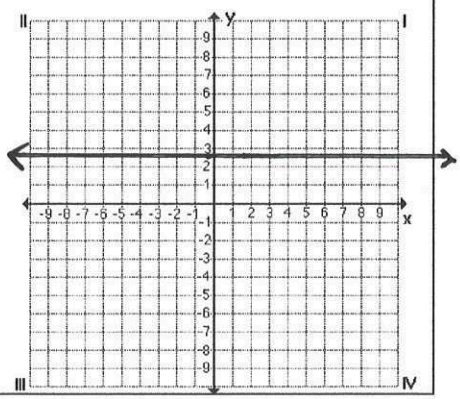
7. $y = -\frac{3}{4}x$



8. $3 - y = \frac{1}{2}$

$-y = -\frac{5}{2}$

$y = \frac{5}{2}$



Part 8: Systems of Equations Find the solution using either substitution or elimination. Show your work.

1. $x + y = 12$
   $x = y + 2$

   $x+y=12$
   $x-y=2$
   $2x=14$
   $x=7$

   $(7,5)$

2. $3x + 2y = 7$
   $(-x + 3y = 8)3$

   $3x+2y=7$
   $-3x+9y=24$
   $11y=31$

   $\left(\frac{5}{11}, \frac{31}{11}\right)$

3. $x = (3y + 1)$
   $6x = y + 6$

   $6(3y+1)=y+6$
   $18y+6=y+6$
   $17y=0$
   $y=0$

   $(1,0)$

4. $x + y = 7$
   $x - y = 9$

   $2x=16$
   $x=8$

   $(8,-1)$

5. $y = (2x)$
   $3x + y = 5$

   $3x+2x=5$
   $5x=5$
   $x=1$

   $(1,2)$

6. $x = (4)$
   $y = 3x - 5$

   $y=12-5=7$

   $(4,7)$

7. $3y = 2 - x$
   $2x = 7 - 3y$

   $3y=2-x$
   $-3y=7+2x$
   $0=-5+x$
   $5=x$

   $(5,-1)$

8. $(2x + 3y = -1)3$
   $(3x + 5y = -2)-2$

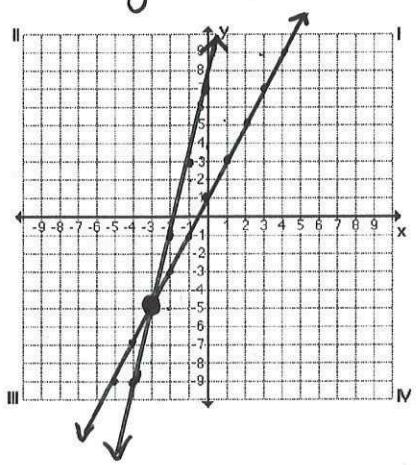
   $6x+9y=-3$
   $-6x-10y=4$
   $-y=1$
   $y=-1$

   $(1,-1)$

#9-10 Find the solution to each system by graphing. Use a ruler.

9. $y = 2x + 1$
   $-4x + y = 7$

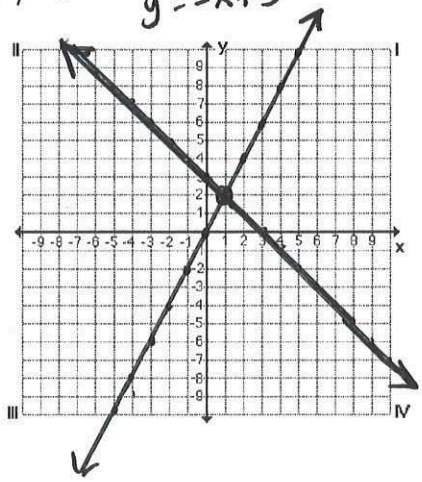
   $y=4x+7$



   $(-3,-5)$

10. $2x = y$
    $x + y = 3$

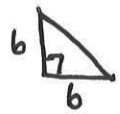
    $y=2x$
    $y=-x+3$



    $(1,2)$

Part 9: Working with Formulas (Distance, Midpoint, Slope) **Find the distance between each of the following pairs of points. Express all answers in simplified radical form. Show your work.**

1. B(3, -8) and C(9, -2)



$6^2+6^2=c^2$

$72=c^2$

d = $6\sqrt{2}$

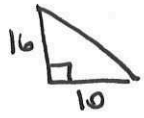
2. X(-5, -3) and Z(4, 1)

$4^2+9^2=c^2$

$97=c^2$

d = $\sqrt{97}$

3. M(8, 4) and N(-2, 20)



$10^2+16^2=c^2$

$356=c^2$

d = $2\sqrt{89}$

4. E(-4, 6) and F(0, -4)

$4^2+10^2=c^2$

$116=c^2$

d = $2\sqrt{29}$

#5-8 Find the coordinates of the midpoint between each pair of points. Show your work.

5. A(5, 6) and B(-3, 2)

$\left(\frac{5+-3}{2}, \frac{6+2}{2}\right)$

M = $(1,4)$

6. C(3, 5) and D(-2, -1)

$\left(\frac{3+-2}{2}, \frac{5+-1}{2}\right)$

M = $(\frac{1}{2}, 2)$

7. T(7, -4) and R(-5, -7)

$\left(\frac{7+-5}{2}, \frac{-4+-7}{2}\right)$

M = $(1, -\frac{11}{2})$

8. S(-1, 6) and V(5, -5)

$\left(\frac{-1+5}{2}, \frac{6+-5}{2}\right)$

M = $(2, \frac{1}{2})$

#9-12 Find the slope of the line between each pair of points. Show your work.

9. A(2, 5) and B(-10, -8)

$m=\frac{5+8}{2+10}$

m = $13/12$

10. T(-1, -7) and R(10, 2)

$m=\frac{-7-2}{-1-10}$

m = $9/11$

11. B(8, 4) and R(-2, 4)

$m=\frac{4-4}{8+2}=\frac{0}{10}$

m = 0

12. M(9, 2) and W(9, -5)

undefined (no slope)

Part 10: Solving Literal Equations **Solve for x unless otherwise stated. State restrictions if necessary. Show your work.**

denom $\neq 0$

1. $C=\frac{5}{9}(F-32)$; solve for F

$F=\frac{9}{5}C+32$

2. $F=G\frac{Mm}{r^2}$; solve for M

$M=\frac{Fr^2}{Gm}$

$G\neq 0$ $m\neq 0$

3. $\frac{1}{x}+a=b$; when $x\neq 0$

$x=\frac{1}{b-a}$ or $x=-\frac{1}{a-b}$ $a\neq b$

4. $y-px-c=bk$

$x=\frac{bk+c-y}{-p}$ or $\frac{y-c-bk}{p}$

$p\neq 0$

5. $\frac{x}{r}-h=4$; when $r\neq 0$

$x=rh+4r$ or $x=r(h+4)$

6. $cx-dx=e$

$x(c-d)=e$ $x=\frac{e}{c-d}$

$c\neq d$

Part 11: Word Problems **For each of the following, define the variable(s), write an equation, and solve. Show all work on a separate sheet of paper.**

1. You are hanging three pictures on a wall that is 16 feet wide. The widths of the three pictures are 2, 3, and 4 feet. You want the space between the pictures to be the same, and the spaces to the left and right of the group to be 6 inches more than the space between the adjacent pictures. How should you position the pictures?
2. Your long-distance phone charges 8 cents per minute for weekday and daytime calls. It charges 5 cents per minute for night and weekend calls. If you made a total of 220 minutes of long-distance calls during one billing cycle, and your bill was $13.16, how many minutes of night and weekend calls did you make?
3. The sum of four consecutive odd integers is 184. Find the four integers.
4. The length of one side of a triangular flower bed is 3 ft less than twice the length of the shortest side and the length of the third side is 3 ft greater than the length of the shortest side. If the perimeter is 36 ft, what is the length of the shortest side?
5. Denise drove to her parent's house at a rate of 70 km/h. She came back by the same route, but drove at a rate of 80 km/h. If the round trip took her 3 hours, what is the distance between her house and her parent's house?
6. The Chans invested twice as much money at 8% as at 6%. If the total of the simple interest for one year is $660, what is the amount the Chans invested at 6%?
7. The sum of three integers is 242. The second number is three more than twice the first and the third number is nine less than five times the first. Find the integers.
8. You have a piece of wood that is 72 inches long. You cut the wood into three pieces. The second piece is 6 inches longer than the first piece. The third piece is 6 inches longer than the second piece. Draw a diagram and then write and solve an equation to find the lengths of the three pieces.
9. A moving company weights 20 boxes you have packed that contain either books or clothes and says the total weight is 404 pounds. You know that a box of books weighs 40 pounds and a box of clothes weighs 7 pounds. Write and solve an equation to find how many boxes of books and how many boxes of clothes you packed.
10. Victor bought $8.40 worth of stamps. He bought 3 times as many $.17 stamps as $.25 stamps and 4 times as many $.02 stamps as $.25 stamps. Find the number of $.25 stamps he purchased.
11. Two planes leave Hobby Airport at noon. One flew east at a certain speed and the other flew west at twice that speed. The planes were 2700 miles apart in 3 hours. How fast was each plane traveling?
12. Assume that a, b, and c are integers and $a \neq 0$. Prove that the solution to the linear equation $ax - b = c$ must be a rational number.

1. $\frac{3}{2}$ ft bw the pictures & 2 ft from edge of wall to closest picture

X = #ft bw pictures
$x + \frac{1}{2}$ = #ft bw p & wall
$4x + 10 = 16$
$x = 3/2$ ft.

2. 148 night/weekend mins

x = # mins used night & wkend
$220 - x$ = " " " " daytime
$.05x + .08(220 - x) = 13.16$
$x = 148$ mins

3. x = 1st odd integer
$x + 2$ = 2nd odd "
$x + 4$ = 3rd odd "
$x + 6$ = 4th odd "

$x + x + 2 + x + 4 + x + 6 = 184$
$4x + 12 = 184$
$x = 43$

43, 45, 47, 49

4. x = shortest side

$2x-3$ = length of 2nd side

$x+3$ = length of 3rd side

$x + 2x - 3 + x + 3 = 36$

$x = 9$ ft.

5. x = distance bw houses (miles)

$R \cdot T = D$

$70 \text{ km/h} \cdot \frac{x}{70} = x$

$80 \text{ km/h} \cdot \frac{x}{80} = x$

time there + time back = total time

$\left(\frac{x}{70} + \frac{x}{80} = 3\right) 560$

$8x + 7x = 1680$

$x = 112$ miles

6. x = \$ invested at 6%

$2x$ = \$ invested at 8%

$0.06x + 0.08(2x) = 660$

$x = 3000$

\$3,000 invested at 6%

7. x: 1st integer

$2x+3$: 2nd integer

$5x-9$: 3rd integer

$x + 2x + 3 + 5x - 9 = 242$

$8x - 6 = 242$

$x = 31$

Integers are 31, 65, 146

8. x: 1st piece wood length (inches)

$x+6$: 2nd piece wood length

$x+12$: 3rd piece wood length

$x + x + 6 + x + 12 = 72$

$x = 18$

18", 24", 30"

9. x = # boxes clothes

$20-x$ = # boxes books

$7x + 40(20-x) = 404$

$x = 12$

12 boxes clothes

8 boxes books

10. x = # 25¢ stamps

$3x$ = # 17¢ stamps

$4x$ = # 2¢ stamps

$[.25x + .17(3x) + .02(4x) = 8.40]\,100$

$84x = 840$

$x = 10$

He bought ~~ten~~ stamps that cost 25¢

11. x = speed of slower plane in mph

$2x$ = speed of faster plane in mph

$R \times T = D$

$x \cdot 3 = 3x$

$2x \cdot 3 = 6x$

$3x + 6x = 2700$

$x = 300$

slower plane : 300 mph

faster plane : 600 mph

12. $ax - b = c$

$ax = c + b$

$$x = \frac{c+b}{a}$$